① Evaluate - give exact answers if possible

Range $-\frac{\pi}{2} \to \frac{\pi}{2}$

ⓐ $\arcsin\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$

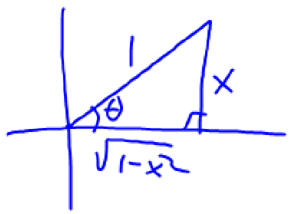
ⓑ $\tan^{-1}\left(\sqrt{3}\right)$ $\quad \frac{\pi}{3}$

ⓒ $\arcsin(0.3)$ $\quad 0.305$

② Find $\cos y$ if $y = \arcsin x$

$$\cos\Big(\underbrace{\arcsin \tfrac{x}{1}}_{\theta}\Big)$$

$$\boxed{= \sqrt{1-x^2}}$$



③ Solve for x $\quad \cancel{\arctan}(2x-3) = \frac{\pi}{4}$

tan

$$2x-3 = \tan\left(\frac{\pi}{4}\right)$$

$$2x-3 = 1$$
$$+3 \quad +3$$

$$2x = 4$$

$$\boxed{x = 2}$$

$y = \sin^{-1}(x)$ $\qquad \sin y = x$ $\qquad \cos^2 y + \sin^2 y = 1$

$$\cos y = \sqrt{1 - \sin^2 y}$$

$$\frac{d}{dx}\left(\sin y = x\right)$$

$$\cos y \frac{dy}{dx} = 1$$

$$\frac{dy}{dx} = \frac{1}{\cos y} \longrightarrow \frac{dy}{dx} = \frac{1}{\sqrt{1 - \sin^2 y}} = \frac{1}{\sqrt{1 - x^2}}$$

$$\boxed{\frac{d}{dx}\sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}}$$

$$\boxed{\frac{d}{dx}\sin^{-1}(u) = \frac{1}{\sqrt{1-u^2}} \cdot \frac{du}{dx}}$$

$y = \tan^{-1}(x) \qquad \tan y = x$

$\frac{d}{dx}(\tan y) = \frac{d}{dx}x$

$\sec^2 y \frac{dy}{dx} = 1$

$\frac{dy}{dx} = \frac{1}{\sec^2 y} \to \frac{1}{1+\tan^2 y} \to \frac{1}{1+x^2}$

$$\boxed{\frac{d}{dx}\tan^{-1}(x) = \frac{1}{1+x^2}}$$

$$\boxed{\frac{d}{dx}\tan^{-1}(u) = \frac{1}{1+u^2}\frac{du}{dx}}$$

$y = \sec^{-1}(x)$ $\qquad$ $\sec y = x$ $\qquad$ $1 + \tan^2 y = \sec^2 y$

$\tan y = \sqrt{\sec^2 y - 1}$

$$\frac{d}{dx}(\sec y) = \frac{d}{dx}(x)$$

$$\sec y \tan y \frac{dy}{dx} = 1$$

$$\frac{dy}{dx} = \frac{1}{\sec y \tan y} \longrightarrow \frac{1}{|x|\sqrt{x^2-1}}$$

$$\boxed{\frac{d}{dx}\sec^{-1}(x) = \frac{1}{|x|\sqrt{x^2-1}}}$$

$$\boxed{\frac{d}{dx}\sec^{-1}(u) = \frac{1}{|u|\sqrt{u^2-1}}\frac{du}{dx}}$$

$$\cos^{-1}(x) = \frac{\pi}{2} - \sin^{-1}(x)$$

$$\boxed{\frac{d}{dx}\cos^{-1}(x) = -\frac{1}{\sqrt{1-x^2}}}$$

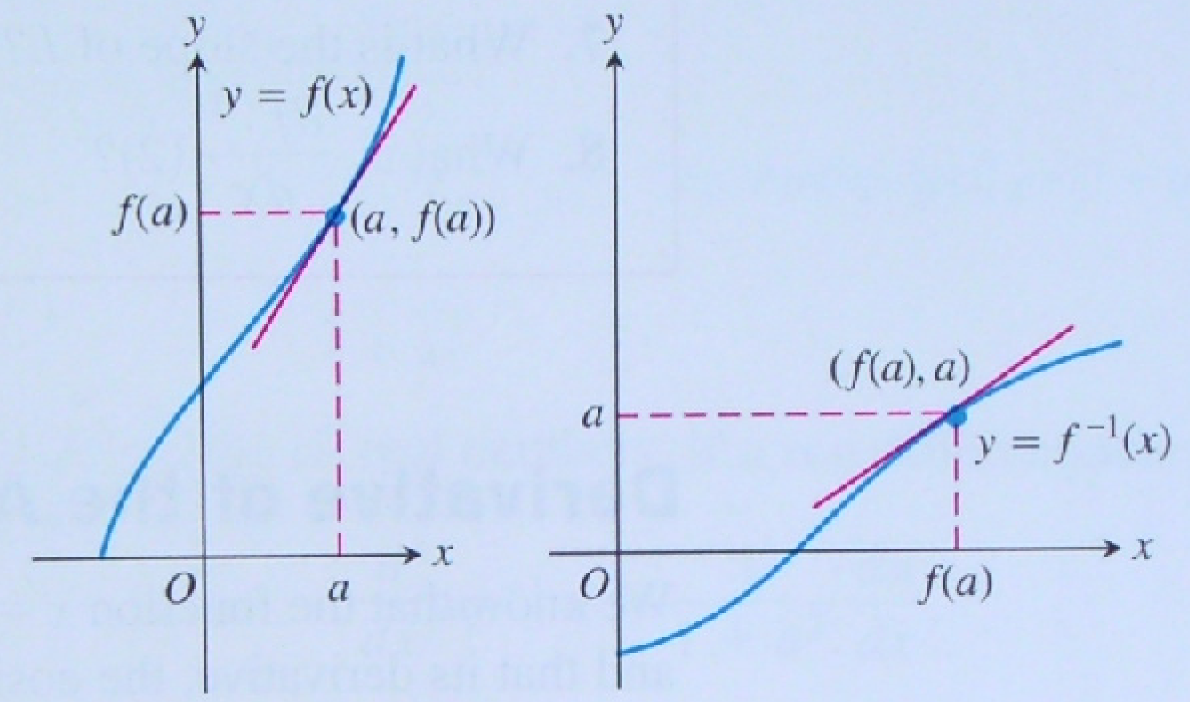
$$\boxed{\frac{d}{dx}\cos^{-1}(u) = -\frac{1}{\sqrt{1-u^2}}\frac{du}{dx}}$$

$$\cot^{-1} x = \frac{\pi}{2} - \tan^{-1}(x)$$

$$\boxed{\frac{d}{dx}\cot^{-1}(x) = -\frac{1}{1+x^2}}$$

$$\csc^{-1}(x) = \frac{\pi}{2} - \sec^{-1}(x)$$

$$\boxed{\frac{d}{dx}\csc^{-1}(x) = -\frac{1}{|x|\sqrt{x^2-1}}}$$



The slopes are reciprocal: $\left.\dfrac{df^{-1}}{dx}\right|_{f(a)} = \dfrac{1}{\left.\dfrac{df}{dx}\right|_a}$

$f(x) = x^5 + 2x - 1$

pt $(1,2)$

Find

$\dfrac{df^{-1}}{dx}$ at $x = 2$

Slope of original at the point

7

Slope of inverse

$\frac{1}{7}$

$f(x) = 3x^4 + 2x^2 - 5$

pt. $(1, 0)$

Find

$\frac{df^{-1}}{dx}$ at $x = 0$

$= \frac{1}{16}$

$\frac{df^{-1}}{dx}$ $x = 51$

Sect. 3.8

#1–8($\frac{1}{2}$), 9–12($\frac{1}{2}$), 13–22($\frac{1}{2}$), 23–26(1), 27–29(2)